

WHAT IS CLAIMED IS:

- 1    1. An impedance transformation network comprising:
  - 2                 an input node to receive an output signal;
  - 3                 an output node to transmit the output signal;
  - 4                 a fixed impedance transformation circuit connected between the
  - 5                 input node and the output node, the fixed impedance transformation circuit being
  - 6                 configured to provide a fixed impedance transformation to partially transform a
  - 7                 first impedance at the output node to a second impedance at the input node; and
  - 8                 a varactor device connected in series between the input node and
  - 9                 the output node, the varactor device being configured to provide a variable
  - 10                impedance transformation in response to a power level of the output signal to
  - 11                partially transform the first impedance at the output node to the second impedance
  - 12                at the input node.
- 1    2. The impedance transformation network of claim 1 wherein the varactor device includes a ferroelectric varactor connected in series between the fixed impedance transformation circuit and the output node.
- 1    3. The impedance transformation network of claim 1 wherein the varactor device includes a plurality of stacked ferroelectric varactors connected in series between the fixed impedance transformation circuit and the output node.
- 1    4. The impedance transformation network of claim 1 wherein the fixed impedance transformation circuit includes at least one transmission line on a signal path between the input node and the output node and at least one shunt capacitor connected to the signal path.
- 1    5. The impedance transformation network of claim 4 wherein the shunt capacitor is a chip capacitor.

1    6.    The impedance transformation network of claim 4 wherein the fixed  
2    impedance transformation circuit includes at least one additional transmission line  
3    on a second signal path between a supply voltage terminal and the signal path and  
4    at least one additional shunt capacitor connected to the second signal path, the  
5    second signal path at least partially being used to supply DC bias voltage to the  
6    varactor device.

1    7.    The impedance transformation network of claim 7 wherein the additional  
2    shunt capacitor is a surface mount technology capacitor.

1    8.    A method of transmitting an output signal to an output node, the method  
2    comprising:

3                 receiving the output signal at an input node; and  
4                 providing a variable impedance transformation between the input  
5    node and the output node using a varactor device connected in series between the  
6    input node and the output node, the variable impedance transformation being  
7    provided in response to a power level of the output signal to transform a first  
8    impedance at the output node to a second impedance at the input node.

1    9.    The method of claim 8 wherein the varactor device includes a ferroelectric  
2    varactor connected in series between the input node and the output node.

1    10.   The method of claim 8 wherein the varactor device includes a plurality of  
2    stacked ferroelectric varactors connected in series between the input node and the  
3    output node.

1    11.   The method of claim 8 wherein the receiving of the output signal included  
2    receiving a radio frequency output signal at the input node.

1    12.   The method of claim 8 further comprising providing a fixed impedance  
2    transformation between the input node and the output node.

1    13.    The method of claim 12 wherein the fixed impedance transformation is  
2    provided by at least one transmission line on a signal path between the input node  
3    and the output node and at least one shunt capacitor connected to the signal path.

1    14.    The method of claim 13 wherein the fixed impedance transformation is  
2    further provided by at least one additional transmission line on a second signal  
3    path between a supply voltage terminal and the signal path, the second signal path  
4    at least partially being used to supply DC bias voltage to the varactor device.

1

1    15.    A power amplifier comprising:

2                 an amplifier configured to provide an output signal; and  
3                 an impedance transformation network including an input node and  
4    an output node, the input node being connected to the amplifier, the output node to  
5    be connected to a load, the impedance transformation network further including a  
6    varactor device connected in series between the input node and the output node,  
7    the varactor device being configured to provide a variable impedance  
8    transformation in response to a power level of the output signal to transform a  
9    load impedance at the output node to a desired impedance in a forward direction at  
10   the input node, the forward direction being from the input node to the output node.

1    16.    The power amplifier of claim 15 wherein the varactor device includes a  
2    ferroelectric varactor connected in series between the input node and the output  
3    node.

1    17.    The power amplifier of claim 15 wherein the varactor device includes a  
2    plurality of stacked ferroelectric varactors connected in series between the input  
3    node and the output node.

1    18.    The power amplifier of claim 15 wherein the amplifier is configured to  
2    provide a radio frequency output signal.

1    19. The power amplifier of claim 15 wherein the impedance transformation  
2    network comprises a fixed impedance transformation circuit connected to the  
3    input node and the varactor device, the fixed impedance transformation circuit  
4    including at least one transmission line on the signal path and at least one shunt  
5    capacitor connected to the signal path.

1    20. The power amplifier of claim 19 wherein the fixed impedance  
2    transformation circuit includes at least one additional transmission line on a  
3    second signal path between a supply voltage terminal and the signal path and at  
4    least one additional shunt capacitor connected to the second signal path, the  
5    second signal path at least partially being used to supply DC bias voltage to the  
6    varactor device.